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STATE DOCUMENTS

STATE OF MONTANA

STATE ENGINEER

SAM W. MITCHELL BUILDING

HELENA, MONTANA

FRED E. BUCK, STATE ENGINEER
HANS L. BILLE, ASSISTANT
C. S. HEIDEL, DEPUTY STATE ENGINEER
A. D. McDERMOTT, ACCOUNTANT

November 30, 1960

Honorable J. Hugo Aronson
State Capitol Building
Helena, Montana

Dear Governor Aronson;

In compliance with the provisions of Paragraph 5, Section 81-2007, 1947 RCM, I have the honor to submit herewith the 29th Biennial Report of the State Engineer for the period ending November 30, 1960.

Respectfully submitted,

Fred E. Buck

Fred E. Buck
State Engineer

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INTRODUCTION

This 29th Biennial Report, which is being prepared to satisfy the provisions of Paragraph 5, Section 80-2007, 1947 RCM, covers the activities of the State Engineer's office for the biennial period ending November 30, 1960.

The office of State Engineer was created by Section 6, Chapter 114, Session Laws of 1903 (80-2006 RCM 1947). At that time the state was actively engaged in the construction of Carey Land Act projects and the State Engineer was delegated with the duties of Chairman and Engineer for the Carey Land Act Board. The other members were the Secretary of State and the State Examiner. The board membership was changed by the Twelfth Legislative Assembly in 1911 to consist of the Governor, Secretary of State, and Attorney General, with the State Engineer as Secretary. The work of the Board has been gradually decreasing until now there is little activity on Carey Act projects. While the work of the Carey Act Board has been decreasing, other responsibilities of the office have been gradually increasing. The last few legislative sessions have placed new responsibilities on the State Engineer.

The first State Engineer appointed was John W. Wade. Succeeding him in order were A. W. Mahon, C. S. Heidel, J. S. James, E. B. Donohue and Fred E. Buck.

CAREY LAND ACT BOARD

After the Carey Land Act was first passed by Congress, August 18, 1894 (28 Stat. 392-422), Montana saw the advantage of its provisions by proposing about a dozen projects. For one cause or another only three projects were finally built under this act -- The Valier, Billings Bench, and Glass-Lindsay Projects. The Valier Project and the Billings Bench have both been turned over from the contractors to the water users to own and operate. The Glass-Lindsay Project near Big Timber is still in the hands of the contractor as far as the records are concerned.

On May 11, 1959 and July 7, 1959 the Board issued two patents to settlers on the Billings Project. These covered the last remaining Carey Act applications which had not been patented to entrymen.

For many years the Carey Land Act Board had been leasing six tracts of land on the Billings Bench which were the only unsold tracts of Carey Land Act lands left on the project.

August 13, 1954, Congress passed an Act (Public Law 582, 83rd Congress, 2nd Session, Chapter 727, S. 2027), providing that the states may turn back to the federal government all remaining Carey Act lands undeveloped. The final date for making such application was August 13, 1957. The matter did not come to our attention until a short time before the dead line. On August 5, 1957, applica-

tion was made to the U. S. Bureau of Land Management in compliance with the terms set out by the statutes for the relinquishment of these Carey Land Act lands to the federal government. At the same time it was requested that the lands be transferred to the Department of State Lands and Investments. The tracts of land in question comprise a total area of 679.08 acres. On January 9, 1959, the relinquishment of these unsold Carey Act lands was accepted and the U. S. Bureau of Land Management issued a quitclaim deed for them to the State of Montana. The following tracts were covered by the deed:

Description	Acres
SE¼SE¼, Sec. 24, T3N, R26E	40
S½NW¼, Sec. 28, T3N, R27E	80
Lots 1 & 2, S½NE¼, and N½SE¼ Sec. 6, T2N, R27E	239.08
W½SW¼, Sec. 32, T3N, R27E	80
E½NE¼, Sec. 24, T2N, R26E	80
S½NW¼, Sec. 8, T2N, R27E	80
E½SE¼, Sec. 4, T2N, R27E	80
	679.08

WATER RESOURCES SURVEY

This work consists of compiling a historical record of all water rights in Montana and mapping the land served. The data are compiled from courthouse records, aerial photographs, court decrees, Secretary of State's office, State Water Conservation Board, U. S. Indian Service, U. S. Reclamation Service, irrigation districts, corporations and all other sources which may be available. After the land and water rights are mapped, data are checked in the field and water users interviewed. Data are published in reports by counties. Part I consists of descriptive matter while Part II consists of colored township maps.

It is hoped when the information is complete for the state, that a modern water code can be enacted. Montana is the only one of the seventeen western states not having a modern water code. Our water right laws are very antiquated and fifty years behind the times. The adjoining provinces in Canada have modern codes similar to our western states excluding Montana. When this survey is completed, it will be the first and only inventory that Montana has ever had of its water rights and water use. These data will prove valuable if the time ever comes when Montana must defend its water rights and use against the encroachments of lower states.

To date 23 counties have been completed and reports published which are: Deer Lodge, Silver Bow, Jefferson, Broadwater, Madison, Gallatin, Meagher, Park, Sweet Grass, Wheatland, Rosebud, Golden Valley, Stillwater, Musselshell, Yellowstone, Carbon, Big Horn, Treasure, Custer, Lewis & Clark, Ravalli, Powell and Granite. Field and office work are completed for Missoula County, and Fallon, Wibaux and Carter Counties. The last named three counties will be combined into one book. Contracts have been let for publication and the reports will be made available for distribution later this season. Field work has been completed for Cascade and Powder River Counties, and the reports for these three counties will be published in 1961.

Of the 23 counties completed to date the following table shows the presently irrigated acres, the additional acres that could be irrigated under present facilities and the total maximum irrigable acres under present facilities:

	Presently Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River Basin	454,888	141,553	596,441
Yellowstone River Basin	514,106	171,548	685,654
Columbia River Basin	222,059	13,627	235,686
Grand Total	1,191,053	326,728	1,517,781

The following table shows the differences between the acres being irrigated in each county completed by the survey with the acres being assessed as irrigated, as shown by the State Board of Equalization. The acreages shown in column three "Water Resources Survey" includes only the acres being actually irrigated and does not include the potential irrigable acres under present facilities. The irrigated acreages as shown under column four "Board of Equalization" are for the year the field work was done on the water resources survey.

		Irrigated Acres	
Counties Completed	Date of Report	Water Resources Survey	Board of Equalization
Yellowstone	Oct., 1943	107,405	100,593
Carbon	May, 1946	97,269	70,595
Stillwater	May, 1946	34,721	25,989
Big Horn	May, 1947	65,570	34,958
Custer	July, 1948	37,343	17,051
Rosebud	July, 1948	27,376	28,798
Musselshell	July, 1949	7,929	0
Golden Valley	July, 1949	5,137	1,896

Counties Completed	Date of Report	Irrigated Acres Water Resources Survey	Irrigated Acres Board of Equalization
(Continued)			
Wheatland	July, 1949	36,618	37,424
Meagher	July, 1950	47,575	38,839
Sweet Grass	Dec., 1950	56,934	35,607
Treasure	Dec., 1951	21,231	17,005
Park	Dec., 1951	63,937	59,582
Gallatin	Jan., 1953	129,984	110,851
Madison	July, 1954	111,996	90,932
Silver Bow	June, 1955	7,006	6,635
Deer Lodge	June, 1955	21,808	25,659
Jefferson	June, 1956	26,280	25,124
Broadwater	June, 1956	42,642	32,190
Lewis & Clark	June, 1957	38,225	39,992
Ravalli	June, 1958	104,569	95,860
Powell	June, 1959	63,262	50,567
Granite	June, 1959	36,693	30,738
Totals		1,191,510	976,885

The totals of the last two columns indicate that 214,625 acres, or 18% (18.01%) of the lands being irrigated in these 23 counties are not being assessed as irrigated land.

PROJECTS UNDER 1944 FLOOD CONTROL ACT

The Flood Control Act passed by Congress December 22, 1944, provides that whenever a project is submitted to the Congress for authorization, it shall have been previously reviewed by each state in the major basin and written comments on the project submitted by each state. This means that Montana shall review any project proposed in the Columbia River Basin which comprises all or parts of seven states, and the Missouri River Basin which comprises all or parts of ten states. Under this act the following projects have been submitted to the State Engineer's office for review and comments within the past two years:

Mann Creek Project, Idaho - This project is located immediately north and east of the town of Weiser. It is proposed to build a reservoir on Mann Creek having a storage capacity of 13,000 acre-feet to be used for a late season water supply for about 4,300 acres of land along Mann Creek and about 800 acres in the Monroe Creek valley.

Three Forks Division of the Missouri River Basin Project, Montana - This re-

port covers a development of the Madison, Jefferson and Gallatin valleys within the State of Montana. This is a very extensive project and it includes many ramifications proposed for developing the full water supply of the three river basins mentioned.

Oroville-Tonasket Unit, Okanogan - Similkameen Division, Chief Joseph Dam Project, Washington - The project is located along the Okanogan River in northeastern Washington. It is a strip about 25 miles long with a maximum width of 3 miles, located in the river valley. The project has an area of 8,450 acres. Of this amount, 1,500 acres are new undeveloped lands and the balance requires a supplementary water supply. The area will be irrigated by direct diversion from both the Okanogan and the Similkameen Rivers by pumping, gravity diversion and from Storage in Palmer Lake. The total project will require 58,760 acre-feet of water annually. Of this amount, 57,040 acre-feet will be diverted from the Similkameen River, and 1,720 acre-feet obtained by pumping from the Okanogan River. It is proposed to create storage at Palmer Lake of 7,480 acre-feet which will feed into the Similkameen River.

The Dalles Project, Oregon - The project is located on bench lands south and east of the town of The Dalles, Oregon. Part of the area is now being irrigated from surface streams and pumping wells. The supply from wells is becoming undependable, and it is now proposed to pump from the Columbia River and deliver water to the district under pressure so that the area can be irrigated by sprinklers. Lands to be irrigated comprise a total of 5,420 acres, 4,927 acres of which will require a lift between 220 and 850 feet. The balance of 493 acres will require a lift between 850 and 1,200 feet.

Teel Irrigation District , Western Division, Oregon - This is the first project submitted to Montana for comments which is proposed to be built under the Small Reclamation Projects Act. It consists of an area of 5,570 acres, located about 15 Miles directly south of the McNary Dam on the Columbia River. Irrigation is to be accomplished with sprinklers, the water to be pumped from the Umatilla River, located about 30 miles above the project. The reservoir is already constructed, having a capacity of 73,800 acre-feet, of which the Teel Project will obtain 18% or 13,300 acre-feet.

Mid-State Project, Nebraska - Under this project it is proposed to irrigate lands in western Nebraska along the Platte River valley. Several reservoirs are proposed. Besides irrigation of lands the project will supply underground water for pumping, prevent floods, generate power, and enhance the fish and wildlife resources. Two definite proposals were made under this project; the first was to develop it by private financing and the work was to be done by private engineers; later, a bill was introduced in Congress to make the project a part of the Missouri Basin Project so that it might receive the benefit of funds from the Missouri Basin Account.

Note - Aside from the Wenatchee and The Dalles Projects none of the other projects out of the state noted above divert water from streams rising in Montana. The use of water in future developments in Montana will not affect the water supply of either of these two projects.

FLOOD CONTROL, CORPS OF ENGINEERS

The Flood Control Act passed by Congress provides that the Corps of Engineers, U. S. Army, may build small projects without congressional authorization. The Corps does, however, require approval of the local authorities and of the state.

Sun River - The Corps of Engineers made studies and submitted reports on protection from flooding of West Great Falls, Augusta and Sun River. Also, the Bureau of Reclamation made studies of the proposed Sun Butte Reservoir in Sun River Canyon with the intent of providing some storage for flood control to help alleviate the damages along Sun River. The bulk of the floods that ravage West Great Falls seems to come from the prairies east of the mountains and not from the canyon. The plan for protecting Great Falls was authorized for construction by the Flood Control Act of 1948, but no funds were appropriated. The local interests could not supply the necessary rights of way or required cooperating funds so the project is being held for some future action.

Madison Canyon Earthquake - On August 17-18, 1959, a severe earthquake, along the Madison River canyon, caused earth and rock to slide into the canyon which dammed the river. The dam caused a new lake to form with a depth of some 250 feet. It was feared that when the lake filled up and then began flowing over the obstruction that it would wash out the dam causing a flood down the valley. Protecting persons and property from such a flood was an emergency case that only the Corps of Engineers could cope with. Men and equipment were rushed to the scene and an emergency spillway was cut through the slide in time to prevent the water from overtopping it. No future trouble is anticipated.

Missouri River Improvement - The State of North Dakota requested the Corps of Engineers to make a study of improving the Missouri River channel between the Garrison and Oahe dams, with a view of checking the river's velocity by small slack water dams which would prevent erosion, stabilize the water elevation to improve pumping conditions and reclaim many acres of irrigable land along the river bottom. A public hearing was held in Bismarck on May 26, 1960. Montana concurred in the North Dakota request. The time will come when slack water dams all along the Missouri River will be required to conserve the water now used for navigation. This conservation will make more water available for irrigation and power which will greatly benefit Montana.

IRRIGATION DISTRICTS

Montana law authorizing the creation of irrigation districts (Section 89-1201 (3) RCM 1947) provides that the State Engineer shall submit to the court his written report embodying:

(1) Engineering features
(2) Possibility of water supplies
(3) A copy of the decreed water rights

The East Bench Irrigation District was the last to be formed in Montana. It was reported in the last bienniul report of the State Engineer. This project is now under construction by the Bureau of Reclamation.

WATER WELLS

Artesian Wells - The 30th Session of the legislature 1947 passed a law (Sec. 89-2901-2910 RCM 1947) providing that logs of all artesian wells drilled in the state shall be filed with the State Engineer's office. The difficulty with this bill is that it contains an erroneous definition of an artesian well. This means that a great many wells which are truly artesian under correct definition do not come under the provisions of this law. This law became effective July 1, 1947. The following are the number of logs filed under this provision:

Total number of wells filed previous to Nov. 30, 1956	483
Number filed in 1956 after Nov. 30	8
Number filed in 1957	25
Number filed in 1958 and 1959	34
Number filed in 1960 (up to Oct. 31)	20
Total	570

Water Wells - The 1957 Session of the legislature passed a law (Chap. 58) providing for the filing of data on all water wells drilled in the state. This measure was approved March 1, 1957 and all acts in conflict with it were repealed. The purpose of this act was to provide a method of filing a record of each well which record may be useful at some future time if it ever becomes necessary to adjudicate any particular water strata or aquifer. The trouble with this law is that it contains no penalties for noncompliance.

The State Bureau of Mines and Geology was instructed to compile and have printed the necessary forms. Data on each well is to be filed within 60 days after completing the well. Three copies of the form are to be filed with the County Clerk and Recorder in the county wherein the well was drilled. He, in turn, will keep one copy, send one to the State Engineer, and one copy to the State Bureau of Mines and Geology, Butte. The information to be filed consists briefly as follows:

(a) Name of landowner
(b) Well began ________, completed ________
(c) Name and address of driller
(d) Location of well
(e) Description of well
(f) Capacity of well
(g) Use to be made of well
(h) Surface elevation of well
(i) Casing record
(j) Log of well
(k) Depth of well
(l) Depth to water horizon and how high water rises in the casing

Since this law became effective, 1,268 logs had been filed with the State Engineer's office up to October 31, 1958. Since then 1,037 additional well reports have been filed up to October 31, 1960. The number of well reports filed for each countysince the law became effective is as follows:

	Number of Filings		
County	3/1/57 to 10/31/58	11/1/58 to 10/31/60	Total
Beaverhead	37	2	39
Big Horn	1	0	1
Blaine	19	15	34
Broadwater	47	20	67
Carbon	23	41	64
Carter	26	53	79
Cascade	12	10	22
Chouteau	59	12	71
Custer	17	3	20
Daniels	7	6	13
Dawson	14	36	50
Deer Lodge	43	34	77
Fallon	10	17	27
Fergus	47	37	84
Flathead	40	27	67
Gallatin	76	41	117
Garfield	16	10	26
Glacier	5	1	6
Golden Valley	25	15	40
Granite	12	7	19
Hill	21	38	59
Jefferson	6	3	9
Judith Basin	32	12	44
Lake	7	12	19
Lewis & Clark	22	0	22
Liberty	10	0	10
Lincoln	16	9	25
McCone	13	29	42
Madison	27	15	42
Meagher	11	0	11
Mineral	14	15	29
Missoula	35	23	58
Musselshell	45	60	105
Park	20	8	28
Petroleum	59	14	73
Phillips	76	33	109
Pondera	3	1	4
Powder River	0	0	0
Powell	16	14	30
Prairie	20	41	61
Ravalli	38	23	61

County	Number of Filings 3/1/57 to 10/31/58	11/1/58 to 10/31/60	Total
(Continued)			
Richland	36	57	93
Roosevelt	17	2	19
Rosebud	17	9	26
Sanders	6	14	20
Sheridan	24	17	41
Silver Bow	23	0	23
Stillwater	18	49	67
Sweet Grass	0	3	3
Teton	5	9	14
Toole	2	0	2
Treasure	2	4	6
Valley	38	44	82
Wheatland	1	0	1
Wibaux	5	23	28
Yellowstone	47	76	123
Total	1,268	1,044	2,312

STREAM MEASUREMENTS

The work of measuring surface flows in streams is carried on jointly by the State Engineer and the U. S. Geological Survey. Each agency contributes one-half of the expense while the actual field work and compiling of data is done by the Geological Survey. These records are very valuable in the design of dams, spillways, reservoirs, bridges, irrigation projects, water supplies, sewage disposal, etc.

The appropriation by the legislature for routine stream gaging operations was $31,380 for each year of the present biennium. Sixty-two gaging stations were operated during the first year and sixty-six during the second year under this program. An additional thirteen stations were partially financed under this program during the first year and sixteen during the second year.

During the present bienniul period one gaging station was constructed on Boxelder Creek near Webster, while the station on Wolf Creek near Wolf Point was discontinued. The operation of five stations was taken over from other cooperatives and one station was transferred to the Forest Service.

It was felt that more information should be accumulated on floods of intermittent streams in eastern Montana. These data are especially needed in estimating the sizes of bridges and culverts, and the design of dams and spillways in the prairie area. Accordingly, crest-stage gages for obtaining high water information only were installed during the previous biennium at three

sites in the Jordan area, two in the Glasgow area and three in the Intake area. Six partial record stations in eastern and central Montana were also established for obtaining low flow data as well as peak stage records.

Yellowstone River Compact - The last legislature appropriated $2,000 per year as Montana's share to operate the Yellowstone River Compact. Wyoming contributed a similar amount and the U. S. Geological Survey matches these two state appropriations on a 50-50 basis. The money has been used to operate seven gaging stations, as provided for in the Compact, and for computations, preparing an annual report, and for administration. Under the terms of the Compact the State of North Dakota is not required to supply any of the funds nor does it take part in the annual meetings.

International Waters - The 1959 legislature appropriated to the State Engineer's office $3,500 per year for this biennium to carry on work along the international border. Of this $7,000 appropriated for the biennium, a total of $5,000 has been allocated to maintaining several gaging stations along the border which money has been matched by the Geological Survey. Records of flow of numerous international streams are necessary in considering the various References before the International Joint Commission. We need to know the amount of water crossing the boundary in each particular case, which justifies the allocation of the above money to be used for this purpose.

INSPECTION OF DAMS

The law provides (Section 89-702 RCM 1947) that whenever a dam is built and interests below the dam are apprehensive that the structure is not safe, they may petition the State Engineer for an inspection of the same and if found to be unsafe, he shall file his findings with the County Attorney of the county wherein the dam is located, who shall then take whatever action is necessary to abate the danger.

Tully Spring Reservoir - On January 30, 1959, a petition having three signatures, complained of the safety of the dam of the Tully Spring Reservoir near Dillon. A field inspection was made May 27, 1959. The fill is 93 feet long, 7 feet high, and 10 to 15 feet wide across the top. The back slope is approximately 1 to 1 and the front slope at least 1 to 2. There is no riprap or outlet gate. The freeboard was only 2 feet. The storage capacity of the reservoir is only about one acre-foot. The drainage area is probably about one square mile. The water supply comes from springs which is diverted by the dam into an irrigation canal. The spillway is a wooden structure which might be enlarged. The structure was not considered in dangerous condition but a recommendation was made for a larger spillway and so reported to the County Attorney.

Noxon Dam - Inspection of the Noxon Dam on the Clark Fork River was initiated by Lieutenant Governor Cannon when he was serving during Governor Aronson's absence from the state. The question of safety was brought to Lieutenant Gov-

ernor Cannon's attention verbally by a labor leader in the Noxon area. An inspection was made June 19, 1959, in company with several officials of the Washington Water Power Company, owners of the dam, and officials of the constructing company. The trouble was that considerable seepage was coming through the natural ground beyond the west end of the dam and under a short section of the west end of the dam itself. This seepage had saturated a fill below the dam which had been levelled off and used for the transformer equipment. A heavy layer of clay was deposited under water over about 20 acres above the west end of the dam. Wells were sunk just below the lower toe of the dam and pumps installed to drain out the saturated soil under the transformer equipment. The remedy used seemed to remove the difficulty, and no complaint has been made since then.

COMPACTS

By law (81-2009 RCM 1947) the State Engineer shall act as Compact Commissioner in negotiating compacts and agreements with other states. These agreements, however, do not become effective until ratified by the State Legislatures of the affected states. At the present time we have only one compact effective, which is the Yellowstone River Compact negotiated between the states of Wyoming, North Dakota and Montana.

A compact is being negotiated at the present time on the Little Missouri River between the states of North and South Dakota, Wyoming and Montana.

After many years of negotiating, a compact for the Columbia River, between the seven states in the Basin, has been agreed to and signed by the seven state's representatives. The seven states involved are: Montana, Oregon, Washington, Idaho, Nevada, Utah and Wyoming. This Compact will be submitted to the 1961 Legislatures.

There is an agreement (Treaty of 1909), which in reality is in the nature of a compact, between the United States and England for the division of the waters of St. Mary's and Milk Rivers along the international boundary.

Yellowstone River Compact - (See State Engineer's Biennial Report of four years ago for the history of negotiating the compact).

This compact provides for the allocation and use of the waters of the Yellowstone River and its tributaries (except that part in Yellowstone Park) between the states of Wyoming, Montana and North Dakota. It provides briefly that water rights perfected prior to January 1, 1950, shall remain status quo and not be disturbed. Only water filings made after that date shall be subject to the terms of the compact, and no water shall be diverted outside the basin. It also provides that the State Engineers of Montana and Wyoming, and the Director of the U. S. Geological Survey shall serve as the Commission to operate the compact. North Dakota is not required to contribute funds toward the operation of the compact nor does it have a vote in compact commission meetings. The federal representative shall be the Chairman and has no vote except in the case

of a tie.

The first meeting which was of a preliminary nature, was held in Helena July 15-16, 1952. It was decided by the Commission that the official meeting time should be each year on the 3rd Tuesday of November alternating between the states of Wyoming and Montana. The first regular meeting was called in Sheridan, Wyoming, November 25, 1952, and regular meetings have been held each year since then at the appointed time and alternating between the two states. On account of bad weather and no important business other than routine matters, the meeting (Billings) for 1959 was transacted by long distance telephone. The 1960 meeting was held in Sheridan on November 10.

It was found necessary to keep a compilation of the water rights filed in the two states after January 1, 1950. Under Wyoming laws such a record is readily available but according to Montana water right laws there is no provision that would render such a compilation possible. Accordingly, the Montana legislature passed, in 1953, Chapter 92, which provides that copies of all water right appropriations filed in the Yellowstone Basin in the area affected by the compact shall also be filed with the State Engineer's office.

Tabulations are prepared yearly of all water rights filed since January 1, 1950, as submitted by the respective County Clerk and Recorders. Most of these filings are on coulees, springs and drains, and are inconsequential in affecting Montana's percentage of the total water supply of major streams. The compact provides for the following divisions of water and the points of measurement:

Stream	Wyoming	Montana	Point of Measurement
Clark Fork	60%	40%	Below the last diversion above Rock Creek.
Big Horn	80%	20%	Below the last diversion above the mouth of the river. (Flow of the Little Horn River is to be excluded).
Tongue River	40%	60%	Below the last diversion above the mouth of the river.
Powder River	42%	58%	Below the last diversion above the mouth of the river.

North Dakota: all water rights below Intake perfected prior to January 1, 1950 shall be unimpaired. The remaining water shall be allotted between Montana and North Dakota in the ratio of their respective irrigated acreages. Water of the

tributary streams below Intake shall be "allotted to the respective states in which situated".

The compact also provides for maintaining stream gaging stations in order to keep a record of the water supply allotted to each state under terms of the compact. The stations maintained for this purpose are as follows: Clarks Fork at Edgar, Little Big Horn River near Crow Agency, Agency Canal at Crow Agency, Little Big Horn River near Hardin, Big Horn River near Custer, Tongue River at Miles City, Powder River near Locate. Records are kept also on the operation of the Boysen Reservoir on the Big Horn River in Wyoming which is a new reservoir built since the compact came into existence.

Little Missouri River Compact - The Congress passed a Consent Bill (Public Law 85-184) which was approved August 28, 1957, providing for the negotiation of a compact on the Little Missouri River between the states of North and South Dakota, Wyoming and Montana.

On January 11, 1958, Major General John S. Seybold (retired) was appointed as the Federal Chairman. His first visit with the State Engineer of Montana was on February 14, 1958. The first meeting of the compact commission was held in Bismarck, April 24, 1958. An Engineering Committee has been appointed consisting of the four State Engineers who are to collect data on water rights and stock water ponds. The Bureau of Reclamation presented an outline of its activities within the basin, and the Geological Survey presented a record of stream gaging stations. The last meeting was held at Bismarck on December 10, 1959.

The matter of type of compact was discussed at the first meeting, that is, whether it should be recommendatory in nature or an action compact. Also it was thought by some that the compact should be set up recognizing priorities of water rights throughout the entire length of the stream regardless of state lines. After the first meeting adjourned it was discovered that the Congressional Subcommittee made this suggestion:

> "The committee suggests that it may be wise for the states to limit the compact to the apportionment of water and defer at this time, so far as the compact is concerned, the matter of development of the Little Missouri Basin."

On July 1 and 2, 1958, a trip was made over the basin by the Chairman and the State Engineers of North and South Dakota, and a representative of the Geological Survey.

During 1958 the field crew of the Water Resources Survey of Montana was transferred to the Little Missouri River basin to secure the required data on water rights and water uses in Montana. Only three counties, Carter, Fallon and Wibaux, are wholly or partly, within the Little Missouri River basin. The survey was completed November 5, 1958 and the results are shown in the following two tables:

TABLE I, Water Filings

	Total number of		Total number of active	
	Filings	Miners Inches	Filings	Miners Inches
Carter County	1105	31,418,089	840	25,223,863
Fallon County	105	2,221,359	90	2,070,399
Wibaux County	24	23,707	21	23,467
Totals	1234	33,663,155	951	27,317,729

TABLE II, Irrigated Acreages

	Irrigated Acres by		
	Filed Rights	Use Rights	Total Acres
Carter County	31,610	11,605	43,215
Fallon County	435		435
Wibaux County	181		181
Totals	32,226	11,605	43,831

The two columns in Table No. 1 show the number of water right filings made and the number of miners inches filed on. The second two columns show the active number of filings and the miners inches actually in use. Table No. 2 shows the number of acres being irrigated by both filed rights and use rights and the total acres.

The U. S. Geological Survey, Bismarck, North Dakota, prepared a list of gaging stations on the Little Missouri River and tributaries, and also a list of chemical quality and sedimentation records available as of April 19, 1958. These main stem stations and the periods of available records are:

Little Missouri River near Alzada, Montana -- June 1911 to September 1925, August 1928 to September 1932, March 1935 to April 1958.

Little Missouri River at Camp Crook, South Dakota -- October 1903 to November 1907, May 1956 to April 1958.

Little Missouri River at Marmarth, North Dakota -- March 1938 to April 1958.

Little Missouri River at Medora, North Dakota -- May 1903 to October 1908, October 1921 to September 1924, August 1928 to September 1934, October 1945 to September 1956.

Little Missouri River near Watford City, North Dakota -- October 1934 to April 1958.

The tributary stations are:

Little Beaver Creek near Marmarth, North Dakota -- April 1938 to April 1958.

Beaver Creek at Wibaux, Montana -- April 1938 to April 1958.

The chemical quality and sedimentation records are available on the Main Stem at Alzada, Montana, and Marmarth, Medora and Watford City, all in North Dakota.

Columbia Interstate Compact - Consideration of the necessity for a Columbia River Compact was first initiated as far back as 1911 by Governor Oswald West of Oregon. In 1925 the Congress passed a Consent Bill authorizing the states of Oregon, Washington and Montana to enter into a compact for the allocation of water of the Columbia River. Nothing was done about it until 1943 when a conference of the Governors of Oregon, Washington, Idaho, Montana and Wyoming met in Boise, Idaho, and created the Northwest States Development Association which had as one of its objectives the development of a compact. The State Engineer of Montana was Secretary of this organization. From 1944 to July, 1949, no further action was taken but in July, 1949, Governor Langlie of Washington undertook to initiate a compact. He called the first meeting in Spokane on July 10, 1950, where the states of Idaho, Montana, Oregon, Washington and Wyoming were represented. It was decided that Nevada and Utah should also be included and that Canada should be invited to participate. Numerous meetings thereafter were held.

On July 16, 1952, a Consent Bill was approved by the United States Congress (Public Law 572, 82nd Congress, 2nd Session). It did not, however, include the states of Utah and Nevada, and, consequently, it was amended later to include these two states.

The Montana Legislature passed JHR 6 in the Session of 1951 authorizing the Governor to appoint members of a Montana Commission who would assist the State Engineer in negotiating the compact. This was approved February 3, 1951. Appointment of the members, however, was not made until a short time after the 1953 Legislature adjourned. In the meantime the State Engineer, under authority vested in him to negotiate compacts (81-2009 RCM 1947), attended the meetings and carried all of the responsibility for Montana's interests.

The compact was finally completed and signed in Portland by all participating states on January 15, 1955. The compact was adopted by the legislatures of the states of Idaho, Utah and Nevada but failed to pass in Oregon, Washington and Montana. It was not introduced in the legislature of Wyoming. Before being pre-

sented to the Congress for ratification, it needed to be approved by only four states - Oregon, Washington, Idaho and Montana. The other three states could approve it at any later time if they so desired.

The transactions that have transpired since 1955 are briefly as follows: In the summer of 1956 several members of the commission discussed the proposed compact with federal representatives in Washington D. C. An agreement was reached on points of question.

The full commission met in Portland on August 6, 1956, when a few changes were made and a full draft of the compact was approved but not signed. The draft was then printed, given wide circulation and many public hearings were held.

On December 4, 1956, the full commission met in Spokane and signed a new compact. It was presented to the legislatures in 1957 with the following results: Idaho, Wyoming, Nevada and Utah - no action was taken; Montana introduced it but no hearings were held nor action taken; Oregon introduced it, extensive hearings were held but no action was taken; and in Washington, a bill was prepared but not introduced.

The next meeting of the compact commission was held in Spokane on April 13, 1957, to consider changes in the provisions. The date of May 1, 1958, was set as the final time when all suggested changes must be submitted. It was decided to attempt to write an action compact rather than a recommendatory one, and a special committee was appointed to study this matter.

The action committee met in Seattle August 19, 1957, at which time it authorized that a request be made of each State Attorney General as to whether or not the respective state could participate in an interstate agency with authority to issue revenue bonds. All states except Idaho reported that such a procedure would be constitutional. The Idaho Attorney General finally reported that this matter would have to be determined by court opinion and legislative action.

The full commission met in Portland, Oregon, on May 16 and 17, 1958, and accepted reports of the various committees and named a drafting committee to prepare a new draft "excluding provisions relating to power except for allocation of power and all revenue bond financing". This committee met in Spokane, July 30 and 31, 1958, and prepared a new draft, eliminating the allocation of power as well as authority to issue bonds to finance projects.

The full commission met again in Spokane, September 12, 1958, to consider this new draft. At this meeting Oregon and Washington refused to support the new draft on account of it not having provisions to issue bonds to finance projects. Many of the articles were controversial in nature and therefore referred to the various committees for redrafting.

The next meeting of the full commission was set for October 13, 1958, but this was cancelled for the reason noted below.

On September 26, 1958, Governor Albert D. Rossellini of Washington, and

Governor Robert D. Holmes of Oregon, met in Seattle and passed the following resolution:

> "It is the concensus of the majority that the Oregon and Washington delegations shall attend the Columbia Interstate Compact Commission meeting at Spokane on October 13, 1958; and
>
> (1) Attempt to reinstate action authority with respect to power or
>
> (2) Failing that, owing to the nearness of legislative sessions, the delegations shall report to their respective legislatures that agreement could not be reached. The delegations will recommend that:
>
> > (1) The present authority for negotiations should be terminated; and
> >
> > (2) New legislation should be drafted, providing for exploration of possibilities for an Interstate Compact in those fields in which it is felt agreement can be reached, namely, pollution control, priority of beneficial consumptive use in the upstream area and prohibition of out-of-basin diversion of water."

Considerable argument covering a rather long period of time took place over the question as to whether the compact should be of recommendatory nature or one which did authorize the commission to issue bonds, buy utilities and operate them. On account of this the compact was not ready to submit to the respective legislatures during the Sessions of 1959. No meetings were held during October, November and December, 1958, but on January 24, 1959 the Executive Committee met and decided to continue negotiations. After numerous meetings of various committees and the full commission, a compact was finally agreed to in Seattle on September 15, 1960. This compact was officially signed by members of the compact commission of all seven states in Spokane on October 3, 1960, and this compact will be submitted to the respective legislatures of 1961. During April, 1960, the State Engineer's office ran out of funds and no more meetings at state expense could be held until after July 1, 1960.

The Secretary's office is in Spokane, Washington. Mr. Calvert Anderson, who had served as Secretary for the entire period of negotiation, resigned as of October 15, 1958. From then until June 30, 1959, Miss Norma French was Acting Secretary. Mr. John B. Sweat has served as Secretary since June 30, 1959.

Montana Section of Columbia River Compact Commission - The Montana members of the Compact Commission are; Glenn H. Larson, Thompson Falls, Chairman; Fred E. Buck, Helena; L. A. Colby, Missoula; W. A. Groff, Victor; John J. MacDonald, Jordan; James E. Murphy, Kalispell; Robert L. Neils, Libby; C. H. Raymond, Hamilton; Donovan Worden, Missoula.

Montana members serving on standing committees are: Executive, Glenn H. Larson, Chairman; Budget and Finance, C. H. Raymond, Chairman; Engineering, Fred E. Buck, W. A. Groff and Robert J. Neils; Fisheries, L. A. Colby, Chairman, and W. A. Groff; Legal, James E. Murphy, Chairman, C. H. Raymond and Donovan Worden; Pollution Control, Fred E. Buck, L. E. Colby and John J. MacDonald; Power, Donovan Worden and W. A. Groff; Special Action Study, Glenn H. Larson and James E. Murphy; Drafting, Glenn H. Larson and James E. Murphy.

The Montana section held only one meeting (the 9th) during the past biennium. This was held at the Florence Hotel, Missoula, on May 21, 1959. The purpose of this meeting was to consider the last draft of the compact of September 12, 1958, and to crystallize the thinking of the Montana membership before going to the next general meeting to be held in Seattle on June 8-9, 1959. Considerable time was devoted to the question of allocation of water power and the depletion study.

St. Mary and Milk Rivers - The Treaty of 1909 between the United States and Great Britain provides that the St. Mary and Milk Rivers are to be treated as one stream for the purpose of irrigation and power and the water shall be apportioned equally between the two countries of the United States and Canada. It was agreed that during the irrigation season the United States is entitled to a prior appropriation of 500 second feet of Milk River or 3/4ths of its natural flow, and that Canada is entitled to a prior appropriation on the St. Mary River of 500 second feet or 3/4ths of its natural flow during the irrigation season. "_ _ _ _ _ _ in making such equal apportionment more than half may be taken from one river and less than half from the other by either country so as to afford a more beneficial use to each".

INTERDEPARTMENTAL ADVISORY COUNCIL ON NATURAL RESOURCES

The Legislature of 1953 passed Chapter 95 (Section 82-3001-3003 RCM 1947) which created the Interdepartmental Advisory Council to be known as the Council on Natural Resources for the purpose of studying the natural resources of the state and recommending to the Governor any revisions or new legislation that might be necessary. The Council consists of seven ex-officio members as follows: Commissioner of State Lands and Investments, State Game Warden, State Forester, Secretary of the Grass Conservation Commission, State Engineer, Executive Secretary of the Oil Conservation Board, Director of the State Bureau of Mines and Geology, and State Highway Engineer. To date there have been 33 meetings held, the first one being on July 21, 1953, and the last on September 28, 1960. The Council has investigated many subjects, some of which are forestry - both state and national - public lands, topographical surveying, water resources, state forest nursery, oil and gas, fish and game, state lands, state parks and highways. Numerous recommendations were made to the Governor for consideration in the Legislative Session of 1961.

During the biennium two field trips were made. The first was in September, 1959, when the group made an inspection of timber operations on state lands in the Swan River valley. The second was made in June, 1960, when the group inspected the Buffalo Creek Cooperative State Grazing District and public access areas for fishing on the Stillwater River near Columbus and on Rock Creek near Red Lodge.

STREAM POLLUTION COUNCIL

The Legislative Session of 1955, passed a measure (Ch. 142) providing for the creation of a State Water Pollution Council. This Council is to work with the State Board of Health and was created for the purpose of abating and preventing the pollution of our streams. Membership is composed of the executive officer of the State Board of Health, the State Fish and Game Director, the State Engineer and four members appointed by the Governor.

In 1958 standards of water purity and quality were established of the flow of the Yellowstone River and its tributaries. In the fall of 1958 similar criteria were established for the classification of the Clark Fork of the Columbia River and its tributaries except the Flathead River. Also, in the fall of 1958, similar criteria were established for the Kootenai River and the Flathead River to its point of confluence with the Clark Fork of the Columbia River and its tributaries. Since then, studies of the Missouri River are being made and it is expected that similar criteria will be established some time during the coming summer.

WATER MANAGEMENT SUBCOMMITTEE, COLUMBIA RIVER

Several years ago the Columbia River Inter-Agency Committee established a sub-committee known as the "Water Management Subcommittee". The purpose is to keep an orderly record of the water supply, the proper establishment of key gaging stations and management of the reservoir storages so as to reduce floods to a minimum in the lower part of the basin and at the same time plan a sufficient water supply to meet the power and navigation needs for the entire season. In the spring of the year a careful study is made of all of the snow courses and estimates prepared of the expected run-off during the flood season. With these data at hand an inventory is made of all of the storage in reservoirs in the basin and plans are carried out to deplete the storage as much as possible so that the space will be vacant to store flood waters when the spring run-off starts. The State Engineer was chosen as a member of this committee. Meetings are held once a month, usually in Portland, Oregon where a minimum working staff is maintained.

SUBCOMMITTEE ON HYDROLOGY

This is a Subcommittee of the Columbia Basin Interagency Committee. Its purpose is to study the records being obtained on climate, snow surveys, stream measurements, evaporation, historical flows, and all other phases of hydrology which affect the flow of the Columbia River. The Committee is also delegated to study the geographical locations of all types of gaging stations and determine the adequacy or insufficiency of such stations. Data obtained by this committee is necessary for the use of the Water Management Subcommittee.

The Hydrology Committee was organized several years ago, with the membership consisting of federal representatives only. At the 39th meeting

held in Portland, July 25, 1957, it was decided that the four major states - Oregon, Washington, Idaho and Montana - should have representation on this committee. Accordingly, Governor Aronson appointed the State Engineer, October 11, 1957, to serve as Montana's representative. The Committee, at present, consists of members from the four states named, the Federal Power Commission, Bureau of Reclamation, Geological Survey, Weather Bureau, Soil Conservation Service, Corps of Engineers, Forest Service and Bonneville Power Administration. The Committee meets once a month in Portland, the day previous to the meeting of the Water Management Subcommittee.

WATER DEPLETION STUDY - COLUMBIA RIVER

The State Engineer's Report of four years ago explained the reason for making a water depletion study of the Columbia River caused by future development of potential irrigation up to the year 2010. The purpose of this study was to determine how much the development would deplete the normal flow of the basin at given points along the river. During the next biennium this report was completed.

It shows that in the Kootenai River Basin in Montana 55,000 acres of new land may be developed by the year 2010, which will deplete the flow of the river where it leaves the state by 59,000 acre-feet or less than 1% of the normal flow.

Within the Clark Fork Basin it is estimated that 645,000 acres will be developed by the year 2010, which will deplete the river where it leaves the state by 882,000 acre-feet or approximately 5.7% of the normal flow of the river.

At The Dalles the flow will be depleted by 9,800,000 acre-feet due to all upstream potential irrigation development by the year 2010. In computing all of the above depletions, returned flow and evaporation from lakes and reservoirs has been taken into account but industrial uses have not.

During the last biennium the Water Management Subcommittee requested that data be brought up-to-date concerning the development of new irrigated lands. Accordingly, the State Engineer submitted his reports, one in May, 1959, and another in March, 1960.

INTERNATIONAL PROBLEMS

There are four References before the International Joint Commission pertaining to water matters between Montana and Canada, none of which have been discharged. They are Columbia River; Waterton-Belly Rivers; Souris-Red Rivers; and Sage Creek. The State Engineer's office has done considerable work on all of these References. He has been a member of the International Engineering Board on the Waterton-Belly and Sage Creek References and advisor on the Souris-Red and Libby Dam. To date these Engineering Boards have not been discharged.

Libby Dam - The Columbia River Reference before the International Joint Commission is dated March 9, 1944. Permission is sought to build a dam on the Kootenai River near the town of Libby, Montana, for the purpose of generating power and flood control. The proposed reservoir will back water into Canada some 42 miles.

On April 8, 1955, the Commission made the following announcement:

> "It was announced that further consideration could not be given to the application of the United States Government for approval of a dam and reservoir on the Kootenai River near Libby, Montana, until the Canadian Government's investigation of Alternative uses of the Kootenay waters in Canada has been completed. One of the Danadian proposals is to divert part of the Kootenay River flow into the Columbia River at Canal Flats, in order to generate additional power at sites in Canada. Such a diversion is permitted under the Boundary Waters Treaty of 1909, but would materially reduce the amount of water available for storage and generation at the proposed Libby site. The Commission was given details of this and other possibilities for the maximum development of the water resources of the Columbia basin which are now under investigation by the Canadian Government."

Recent newspaper accounts are to the effect that Canada and the United States have reached an agreement based on allowing Canada credit for the additional power generated in the United States due to storages to be built in Canada. Also, that a treaty will be introduced in the next sessions of both Parliament and Congress ratifying the agreement. In December, 1959 the International Joint Commission prepared a report recommending principles to be applied in determining benefits from cooperative storage and electrical interconnection in the Columbia River system and the apportionment between the two countries of such benefits. On September 28, 1960 after a series of meetings delegates of the two countries signed a progress report recommending certain proposals to be included in any treaty. That report has just been received by the State Engineer's office. It contains recommendations regarding development of the Libby Project.

Waterton-Belly Rivers - This Reference is dated January 12, 1948 and was finally prepared after two years of previous negotiations. Considerable field work on the project was done by the Bureau of Reclamation prior to the date of the Reference. These two rivers rise in Glacier National Park and flow northward into Canada.

The original Engineering Board appointed by the Commission, was given four problems to resolve. They succeeded fairly well until the fourth was reached which reads as follows: "To conduct necessary investigations and to prepare a comprehensive plan or plans of mutual advantage to the two countries for the conservation, control, and utilization of the waters under reference in accordance with the recommended apportionment thereof". This brought about an impasse which resulted in two engineering reports being written - one by the Canadian Engineers and the other by the United States Engineers.

No further engineering work was done on the project until October 7, 1953, when the Commission appointed a Special Engineering Committee to consider

the report previously submitted by the Canadian Engineers. This new committee's report was submitted February 25, 1954, and was not acceptable to the Canadians. As a result the Commission on April 8, 1955, had this to say about the project:

> "After a thorough investigation and protracted negotiations, the Commission has been unable to reach a solution which might be jointly recommended to both Governments for an acceptable basis on which to apportion the waters of the Waterton and Belly Rivers between the State of Montana and the Province of Alberta. In consequence, the Commissioners will not report direct to their respective Governments on this matter".

This thought was expressed in the form of a resolution presented to the Commission by the Chairman of the Canadian Section. The three Canadian members voted for the resolution and the three United States members voted against it. This situation brought to a close any further negotiations by the IJC, and Canada is proceeding with the construction of its project of about 500,000 acres to be irrigated in Alberta predicated on the use of all of the water of the Waterton and Belly Rivers.

Souris-Red - The Souris-Red Rivers Reference includes all of the streams crossing the international border between the eastern boundary of the Milk River basin on the west up to and including the drainage basin of the Red River of the North on the east. The Reference is dated January 12, 1948, and an International Engineering Board was appointed April 7, 1948. The last report of this board was dated September 29, 1950. The State Engineer made a field trip with representatives of the Indian Department and Bureau of Reclamation on May 2-4, 1955, in the matter of examining some of the disputed projects.

The last allusion to this reference was on May 26, 1959 when the Corps of Engineers called the State Engineer by long distance to ascertain whether or not there were any new developments so far as Montana was concerned. The inference was that work was being done with a view of closing up the matter but no action has been taken by the IJC.

Sage Creek - Sage Creek rises in the Cypress Hills in Canada, flows southward across the border and dissipates in a large glacial lake in Montana with no outlet. The earliest water rights are in Montana. The Reference before the Commission was dated April 8, 1946 (IJC Docket 53). The final report of the International Engineering Board was submitted in October, 1949, and since that time yearly reports have been submitted showing the flow of the stream and the amount of water which crosses the border.

On October 4, 1951, the Commission appointed an Internation Land Use Board to study the classification of soils and the most economical application of water to the land. This final report was dated March 2, 1953.

A plan of settling the matter was finally drafted by the Commission and submitted to the Canadian farmers, at Medicine Hat on February 11, 1955, who approved it. The same plan was submitted to the Montana farmers at a meet-

ing in Havre on September 4, 1955, and the same was found acceptable to them.

The plan is briefly as follows: The Canadians will build a reservoir of 7500 acre-feet capacity on Sage Creek in Canada and a diversion canal to the international boundary. This work will be paid for by Canada. The Montanans will be required to maintain the canal and will be given a permit to enter Canada for this purpose. The apportionment of water in the reservoir between the two countries will be on a sliding scale depending on how much water is in storage at the beginning of the irrigation season. The Canadians will organize an association to maintain the reservoir and divide the water according to the agreement. If, for any reason, the Montanans are dissatisfied at any time with the acts of the association, they will be given the privilege of placing their complaint directly before the International Joint Commission.

After this plan was finally agreed to, the United States section of the Commission insisted that the plan should be approved by the State of Montana. This meant legislative approval as there is no department of the State that can approve an agreement with a foreign country. Accordingly, the Governor recommended in his message to the 35th session, 1957, of the State Legislature, that he be given the privilege of approving the plan. The legislature thereupon passed Chapter 23 which gave the Governor the requested authority. It was approved February 19, 1957, and given full force and effect from and after its passage.

At the semi-annual meeting of the IJC held in Ottawa on October 1, 1957, the matter was given full discussion and the following extracted from the Minutes of that meeting:

> Chairman McNaughton of the Canadian section read a statement of September 19, 1957, from the Canadian Department of Agriculture concerning the Sage Creek Project. Said statement advised that on present estimates the project cost would be about $400,000 rather than the $250,000 previously estimated, and therefore, the project is not justified because the benefits would be limited to the few land owners directly affected in the basin. Thus, the possibility of development of a plan that would have provided a solution to the project has been removed. One of the Canadian commissioners reported that part of the difficulty was that the new Canadian Minister of Agriculture failed to agree with the previous proposal of the works planned. No immediate action was possible at this time but one of the Canadian commissioners agreed to contact the Canadian Department urging support of the Province. Since that time this commissioner has retired. In the meantime, the Commission will complete its report to the respective governments.

In view of the fact that inflation intervened between the time of the agreement of the plan and the present, which nearly doubled the estimated cost, it is not very likely that any further consideration of the proposal will be given by the IJC.

Every fall prior to the freeze-up, a representative of the U. S. Government and one from Canada have made a field trip to inspect the condition of Sage Creek and have any obstructions removed that might impede the spring flow before the winter's ice and snow melts. Mr. Sumner Heidel and Mr. Orrin J. Folsom have represented the United States and also Montana, and Mr. Jack Reid has represented Canada and Alberta.

On April 3, 1958, a conference was held with Mr. Reid regarding the matter, at which time it was decided to discontinue these inspections. Although the International Joint Commission has not discharged the committee or ordered the inspections stopped, it was deemed unnecessary in view of the inconvenience, expense in comparison with benefits derived, and action of the IJC in not approving the project for construction as previously agreed upon, but nevertheless, inspections are still being made.

COORDINATING COMMITTEE ON MISSOURI RIVER MAIN STEM

RESERVOIR OPERATIONS

A committee of 16 was organized by the Corps of Engineers to study the flow of the Missouri River and to work out annual operating plans for the major reservoirs. This committee was composed of representatives of nine states affected together with seven members of federal departments. Two additional committee members have been added. The State Engineer represents Montana. The first meeting of the committee was held September 17, 1954. Since then, two meetings have been held each year - one in the spring and one in the fall.

On April 29, 1958, the Committee held its first public hearing at Omaha for the purpose of giving all affected interests an opportunity to express their views on the operation of the Missouri River Reservoirs. The meeting was well attended by representatives from industry, barge lines, railroads, truck lines, municipalities, Chambers of Commerce and individuals. After reviewing the evidence submitted it appears that the general consensus of opinion was that the Committee had done an excellent job, especially when considering the deficiency of water to fill the two reservoirs recently completed. It was realized that it will take several years before this system can be operated at 100% efficiency with all reservoirs filled. Similar public hearings were held at Omaha on April 30, 1959 and May 17, 1960, with about the same reactions as resulted from the first hearing.

The following table shows, in 1000 acre-feet, the maximum storage capacity of each reservoir; and the total acre-feet in storage on October 4, 1958 and October 8, 1960.

Reservoirs	Maximum storage	Dead storage	In storage 10/4/58	In storage 10/8/60
Fort Peck	19,412	4,535	9,025,600	11,875,180
Garrison	24,500	4,900	8,558,100	11,281,638
Ft. Randall	6,300	1,400	2,835,645	4,104,091
Gavin's Point	540	135	446,657	464,414
Oahe*		5,500	0	0
Big Bend*		450	0	0
			20,886,002	27,725,323

* Oahe was completed during the summer of 1959 and Big Bend has not been constructed.

The Fort Peck Reservoir was placed in operation for navigation in 1938. Power generation was started with the completion of the first power unit in July, 1943. On account of the drought period during the 30's, the reservoir was not filled to normal operating levels until 1945. The Garrison Dam came into operation in 1954, Fort Randall in 1953 and Gavin's Point in 1955.

The following table shows, in million kwh, the growth of power generation. The figures are for yearly periods, August 1 to July 31:

	1955-56	1956-57	1957-58	1958-59	1959-60
Fort Peck	460	522	483	658	716
Garrison	237	878	1,186	1,337	1,205
Ft. Randall	1,144	1,013	1,177	1,249	1,062
Gavin's Point	0	319	493	507	474
	1,841	2,732	3,339	3,751	3,457

During these five years the water releases have generated power as shown in the above table. They have been sufficient to meet requirements for navigation seasons, have been regulated so far as possible to benefit fish and wildlife, and storage has been increasing. Water in storage on each July 31 is shown, in thousands of acre-feet, in the following table:

	1955-56	1956-57	1957-58	1958-59	1959-60
Fort Peck	6,614	7,394	9,268	11,120	12,318
Garrison	6,680	10,258	10,145	10,257	11,664
Oahe				308	2,526
Ft. Randall	3,052	3,787	4,098	4,265	4,196
Gavin's Point	361	420	452	438	423
	16,707	21,859	23,963	26,388	31,127

RESERVOIR CONTROL COMMITTEE, CANYON FERRY AND TIBER RESERVOIRS

The committee was organized by the Bureau of Reclamation to regulate the control of these two reservoirs. The committee consists of representatives of the Bureau of Reclamation, Corps of Engineers, Montana Power Company, U. S. Geological Survey, Fish and Game Department and the State Engineer. The first meeting was held at Canyon Ferry dam on October 18, 1956, and the last meeting was held at the Helena Civic Center on October 20, 1960.

The Canyon Ferry dam, which is located about 25 miles east of Helena was built by the Bureau of Reclamation to make available for irrigation and power all of the unused and unappropriated waters of the upper Missouri River basin. The reservoir serves to control floods and regulate power generation on the lower Missouri River.

The Tiber reservoir was built by the Bureau of Reclamation on the Marias River 68 miles above its mouth. The reservoir is to serve for irrigation and flood control. The irrigation project consisting of about 115,000 acres, situated on the bench between the mouth of the river and Havre, has never been developed; therefore, at the present time the only use being made of the reservoir is to regulate floods. It also serves as an excellent recreation area.

The problem at Canyon Ferry is the protection of wild geese during nesting season. The birds begin building their nests about the middle of March and the young goslings take to the water about the middle of May. They nest on the ground near the waters edge and therefore if the lake level is raised during this nesting period the hatch will be destroyed.

At Tiber reservoir there is some trouble with settlement of the spillway. This coming season (1961) it is proposed to raise the lake level one foot (to elevation 2984) higher than last year. Thereafter, it is proposed to raise the lake elevation one foot each year until the maximum is reached so as to observe the effect on the spillway. It is estimated by the Fish and Game Department that this type of operation will enhance the fishing resource rather than hinder it.

ADEQUACY OF FLOW, MISSOURI RIVER

The Missouri Basin Inter-Agency Committee on October 5, 1950, passed a resolution asking for a committee to be named to make a study of the flow of the Missouri River and the uses being made of the water. Also, it asked for the projection of these uses into the future. The committee that was named to carry on this investigation consisted of representatives of seven federal departments and two State Engineers, one from the upper basin and one from the lower basin. The federal agencies consisted of Federal Power Commission, Public Health Service, Geological Survey, Weather Bureau, Bureau of Reclamation, Department of Agriculture, and the Corps of Engineers. The two State Engineers named were from Montana for the upper basin and Kansas for the lower basin. The resulting report was dated April, 1951.

On December 10, 1958, the MBIAC requested a review of the 1951 report. It realized that changes come about, such as, trends in population growth, changes in water use, economic development, and technological changes of the basin. Therefore, the report should be reviewed and corrected from time to time to keep pace with the current conditions. The same committee as above was named to review the supplemental report, which was dated April, 1959.

Most of the data in the original report was basic and gave no indications of material changes. To that extent, the original and the supplemental reports are similar. It was found, however, that during the interim there was a slow-down in the rate of future irrigation depletions, and also, that additional flow records of water had been accumulated. Adjustments were made in the supplemental report covering mainly these two subjects. Upon receipt of the supplemental report by the MBIAC they passed a resolution on June 10, 1959, accepting it and complimenting the committee for its preparation. The last paragraph of said resolution, which is very pertinent to the supplemental report reads as follows:

> "NOW, THEREFORE, be it resolved that the report be accepted with such reservations and with the understanding that the report and its conclusions do not constitute water allocations to any areas, States, geographic or Governmental subdivisions or water-user interests."

PACIFIC NORTHWEST - CALIFORNIA ELECTRIC INTERTIE

On April 8-9, 1959, a public hearing was held in Portland by the Senate Interior and Insular Affairs Committee on the proposal of extending an electrical intertie between California and the Bonneville electrical grid. Two proposals were made: one, to extend the line from Oregon into northern California to tie with the Pacific Gas and Electric and the California-Oregon Power Companies; and second, to build a new high voltage power line from The Dalles power plant into central California. Since the Bonneville Power Administration has been operating in the red during the past two years, the purpose of this proposal was to sell surplus dump power in California from the Bonneville grid.

Under date of May 11, 1959, the Subcommittee on Irrigation and Reclamation of the Interior and Insular Affairs Committee recommended a resolution directing the Secretary of the Interior to direct the Bonneville Power Administration in cooperation with the Bureau of Reclamation to make an analysis and study of the feasibility of the proposal and to submit a report by July 15, 1959. The Committee adopted this resolution on May 19, 1959. This report was to include consultations with the Governors of California, Oregon, Washington, Idaho, and Montana. Also, the Federal Power Commission and the Pacific Northwest Power Pool, as well as organizations representing public and private utilities in California were to be consulted.

Two meetings of representative of all interested groups were held in Portland on June 25, 1959, and July 23, 1959. It was found that it would not be

possible to submit the requested report by the deadline of July 15, 1959, and therefore, the Senate Interior and Insular Affairs Committee extended the time until the report would be available.

This report was finally prepared and submitted on February 15, 1960. The report submitted by Montana practically agreed with those submitted by other Governors and other interested agencies in the Pacific northwest. Montana did not object to the sale of surplus power to California providing that the same could be withdrawn for delivery to the users in the Pacific northwest states, if and when needed. This position would strengthen the financial condition of the Bonneville grid. Objection was made, however, to extending power into California if the preference clause would attach thereto. The Bonneville power act governing its administration provides that preference customers shall extend to all areas served by the Bonneville Power Administration. If the intertie should be built, this would mean that California could acquire preference customers. This feature was objectionable because if the tie should be made, California preference customers would thereafter have to be served regardless of any shortage of power demand that might be created sometime in the duture in the Pacific northwest. The intertie would be a further drain on Montana's water resources to supply additional electric current to California customers.

SENATE SELECT COMMITTEE ON NATIONAL WATER RESOURCES

The 86th Congress adopted Senate Resolution No. 48 on April 20, 1959, which established the Senate Select Committee on National Water Resources. The resolution proposed an inventory of all water uses in the United States projected to the year 1980. Prior to this time several attempts had been made to accomplish this end by numerous Boards, Commissions and Committees, none of which seemed to be conclusive. The final report of the committee was to be submitted to Congress on January 31, 1961.

The legislative responsibilities relating to water resources in the Senate is divided among four committees and, therefore, it is the intent of the Senate Select Committee to combine all of these responsibilities into one head. The Congress is becoming very apprehensive over the quantity and quality of waters of the United States available to support the growing population and industries. All federal bureaus and state departments dealing with water resources were requested to submit pertinent data dealing with water supplies. In this connection the State Engineer was requested to prepare a report for Montana which covers many items, some of which are: summary of water resources available; withdrawal and use of water; groundwater problems; pollution abatement; population growth; uses for municipalities; agriculture and industry; power; navigation; flood control; recreation and sewage disposal. Also, the report contains methods and costs in developing new supplies, vegetational management, evaporation and seepage, purification of water, management of river basins, etc.

The report is rather voluminous and contains much pertinent information pertaining to the water resources of Montana.

WATER RESOURCE DEVELOPMENT, COLUMBIA RIVER BASIN

(commonly called, "Army 308 Report")

Section 1 of the River and Harbor Act of January 21, 1927 directed that surveys be made as recommended by House Document 308, Sixty-ninth Congress, 1st Session. That document listed streams considered worthy of investigation. A comprehensive two volume report on Columbia River and Minor Tributaries was published in 1933 and 1934. An eight volume report on the Columbia Basin dated 1949 was published in 1952 as House Document 531, 81st Congress, 2nd Session. Numerous other reports have been prepared in connection with the Columbia Basin studies.

In compliance with several resolutions adopted by the Senate Public Works Committee between 1948 and 1956 the Corps of Engineers of the United States Army has prepared a review of House Document 531. It is entitled "Water Resource Development of the Columbia River Basin", and is in five volumes, dated June, 1958. It was made available in December of 1958 and is commonly referred to as the "308 Report". The five volume report was submitted to the State Engineer for study and review.

The 308 Report formulates a plan called the "Major Water Plan" consisting of fourteen proposed projects in the Columbia River basin selected from a number of alternatives. It is believed that these projects together with those completed, under construction and reasonably assured, will provide for optimum utilization of the United States portion of the resources of the Columbia River Basin. Subjects which are considered and discussed in the report include flood control, power, navigation, irrigation, fish and wildlife and other uses. The Montana projects included in the Major Water Plan are Libby, Long Meadows, Ninemile Prairie, Flathead Lake Outlet Improvement and Knowles.

Libby Project - Libby Dam would be a concrete gravity type structure 400 feet high at a site on the Kootenai River 15 miles above Libby and 51 miles below the International Boundary. It would back water 42 miles into Canada. An application for approval was made to the International Joint Commission in 1954. Its primary purposes are for flood control and power.

Long Meadows Project - Long Meadows Dam would be a concrete gravity type structure 280 feet high on Yaak River 30 miles above its mouth and 2.8 miles below the toen of Yaak. The reservoir would be 20 miles long and extend to within 3.5 miles of the International Boundary. Its primary purposes are for flood control and power.

Ninemile Prairie Project - Ninemile Prairie Dam would be an earth fill 300 feet high on the Blackfoot River 22 miles above Bonner and 8 miles above McNamara, creating a reservoir 14 miles long. Its primary purposes are for flood control and power.

Flathead Lake Channel Improvement Project - The plan for improvement of the Flathead Lake Channel proposes to deepen the upper 2 miles of the outlet channel in order to more advantageously manage the outflow from Flathead Lake. Its primary purpose is for flood control.

Knowles Project - Knowles Dam would be an earth fill 266 feet high on the Flathead River 5 miles above the town of Paradise. It would back water up to the tailrace of Kerr Dam and flood out the proposed Buffalo Rapids Project No. 4. The Knowles and Ninemile Prairie projects are considered as an alternative for Paradise Dam. The primary purposes of Knowles Dam are flood control and power.

The Ninemile Prairie Project has been investigated by the Bureau of Reclamation, and the other four are Corps of Engineers projects. The table which follows lists a few details of the Montana projects:

Montana Projects in the Major Water Plan

Project	Usable Storage 1,000 Acre-feet	Area Flooded in Acres	Power Installed Ultimate, Kw
Libby	5,010	48,000	688,000
Long Meadows	400	7,740	18,000
Ninemile Prairie	885	11,450	60,000
Flathead Lake Channel Improvement	1,220		
Knowles	3,080	51,554	512,000
Totals	10,595	118,744	1,278,000

Eight projects were considered in alternative plans, of which six are in the Snake River Basin in Idaho, and two in Montana. The Montana projects are Buffalo Rapids No. 4 on the Flathead River and Paradise on Clark Fork River. The construction of Buffalo Rapids No. 4, with a flooded area of 16,467 acres, usable storage of 668,000 acre-feet and ultimate power installation of 448,000 kw would be precluded by construction of either the Knowles or Paradise dams. The construction of Knowles Dam would preclude the building of Paradise which would provide usable storage of 4,080,000 acre-feet, an ultimate installed power capacity of 864,000 kw and flood 66,130 acres.

There are twelve Montana projects and ten in the other states which have been studied as possible future elements of the Major Water Plan. The Montana projects are Mile 204.9 and Kootenai Falls on the Kootenai River, Upper Yaak Canyon and Lower Yaak Canyon on the Yaak River, Smoky Range on the North Fork of the Flathead River, Spruce Park on the Middle Fork of the Flathead River, Coram on the Flathead River and Plateau, Quartz Creek, Superior, Quinn Springs and Eddy on the Clark Fork River. All are designed for power, while in addition

to power Spruce Park will help flood control and irrigation. The total ultimate kw capacity of these 12 projects is 1,467,200.

MISCELLANEOUS

State Water and Planning Boards - The State Engineer, by statute (Title 89, RCM 1947), is an ex-officio member of the State Water Conservation Board and the State Planning Board. The first named Board was created by the Special Legislative Session of 1933-34 (89-101 to 141 RCM 1947) and the second, by the regular Session of 1935 (89-301 to 309, RCM 1947). The Planning Board had been inactive from about 1936 to 1955 when the Legislature of 1955 appropriated $25,000 for each year of the biennium to activate an industrial program. It is not within the scope of this report to cover the activities of either Board.

Snow Surveys - It has been the practice to hold a meeting in Billings every spring to review the results of snow surveys for Montana during the preceding winter and make estimates of the probably run-off of the Missouri River Basin. These estimates are prepared by the Soil Conservation Service and the Weather Bureau. On some occasions estimates have also been presented by the U. S. Corps of Engineers, the Bureau of Reclamation and the Montana Power Company.

Also a general meeting of all the western states is held annually to analyze the probably run-offs of all western streams, as well as explore the new uses that can be made of the data. These meetings are rotated among the various western states.

Garrison Diversion Unit - The Bureau of Reclamation submitted its report on the Garrison Diversion Unit, dated January 1957, for review. This project was authorized by the 78th Congress 2nd Session (Senate Docket 191), known as the Pick-Sloan Plan. The project consists of pumping water from the Garrison reservoir to the Snake Creek reservoir from where canals will distribute water to a total of 1,007,000 acres of land located along the Souris and Cheyenne River Basins, and the rehabilitation of Devils Lake in North Dakota.

It is estimated that twenty-five years will be required to build the project with an ultimate full development requiring sixty years. The State of North Dakota, through a legislative act, created a Conservancy District to assist in repayment of the project cost. The grand total cost is estimated at $695,051,000 (cost as of January, 1956). Of this amount the reimbursable cost is $642,037,000, 17.4% of which is to be repaid by the irrigators and revenues from the Conservancy District. The balance is to be repaid from power revenues of the Missouri Basin. To date, Congress has not appropriated funds to initiate construction work.

Lower Willow Creek - This project is being built by the Soil Conservation Service under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666) and amendments (Public Law 1018, 84th Congress; 70 Stat. 1088).

A reservoir is being built on Willow Creek, Granite County, to store 5,100 acre-feet to supply supplemental irrigation to 3,134 acres, as well as prevent floods in Lower Willow Creek valley. The present Dooley Canal which diverts about one mile below the proposed dam site will be used to distribute the water.

This is the first project proposed in Montana under the above named authority.

Underground Water - An underground water code has been introduced in four legislative sessions -- 1953, 1955, 1957 and 1959, but each time it has failed to pass. The bill introduced in the first two named sessions made the State Engineer the Administrator. The third bill split the administration between the State Water Conservation Board and the State Engineer, and the fourth measure put the administration with the Water Board. Another bill will undoubtedly be introduced in the 1961 session. The time will come, and not too far distant, when an underground water code will be imperative. A beginning was made on this question when the 1947 legislature passed a bill (Sec. 89, 2901-2910 RCM 1947) for filing logs of artesian wells. The fallacy of the bill was the definition given of an artesian well. In 1957 the legislature passed a measure (Ch. 58) providing for the filing of logs of all wells drilled in the state. This was a step in the right direction as it will establish priority of rights in various aquifers. In 1955 the State School of Mines and Geology made available $10,000 to cooperate with the U. S. Geological Survey on a 50-50 basis to drill wells over the state for the purpose of exploring the underground water resources, and to establish the boundaries of various aquifers.

SMALL PROJECTS, NRA

About ten years ago the National Reclamation Association appointed a committee of five members to make a study of small projects throughout the 17 western Reclamation states, and to promote a bill in Congress to provide loans for financing such projects. The State Engineer of Montana was one of the five selected.

At that time a maximum of $100,000 could be borrowed from the Home Loan Administration to finance small irrigation projects. The Bureau of Reclamation, while it had the authority to build projects larger than this, it was not the policy to attempt the construction of small projects on account of the overhead expense: therefore, there was a need of obtaining some type of financing that could bridge the gap.

A bill to meet this contingency was finally passed by Congress which provided that loans up to $1,000,000 could be made for this purpose. It provides that the local owning agency may secure the loan and build its own project thus reducing the overhead expense. The committee is still working on refinements of the bill to make it more pliable.

Numerous projects are under construction and many more have applications filed to take advantage of this provision. California and Utah are two outstand-

ing states that have made extensive use of this measure to build small projects. Montana, so far, has not taken advantage of the opportunity.

Cost-Benefit Ratio, NRA - There has been considerable controversy over the so-called cost-benefit ratio established by the Bureau of Reclamation in evaluating the feasibility of proposed projects. The National Reclamation Association has undertaken a study of this problem and called upon the State Engineer of Montana to make a thorough study of the question and to submit a report to the National Reclamation Association, which was done under date of May 10, 1960. It was found that there are many intangible benefits derived from the development of irrigation projects which can not be valued in dollars and cents. Therefore, such items do not appear as benefits on projects proposed by the Bureau of Reclamation.

Water Resources Policy Committee, NRA - The Water Resources Policy Committee of the NRA is compiling a water resources program for the 17 western reclamation states and requested Montana to compile its report which was submitted to the committee under date of September 9, 1960. So far, all the emphasis on water resources development seems to be in Congress and very little recognition is being given to the activities of the states themselves. It is for this reason that a resume of such activities is being prepared. It will not only assist the various states but will serve as a guide to all federal agencies.

The program prepared for Montana covered such subjects as: water laws, interstate compacts, federal cooperative programs, state water conferences, natural resources, topographical mapping, aerial mapping, State Water Conservation Board, Water Resources Survey, pollution, international problems, and reservoir control committees.